REMARKS/ARGUMENTS

Claim 2 has been rejected under Section 112 in that the amino acids fail to meet the general conditions of the position 2, 3, or 4. Claim 2 has been amended to recite that the amino group is in α, β, or γ position relative to the carboxyl group. This is consistent with IUPAC nomenclature. It is respectfully submitted that with the amendment, Claim 2 is not subject to rejection under Section 112.

Claim 9 stands rejected under Section 112, the Examiner's position being that the multiple ranges are confusing. Claim 9 has been amended to set forth that the ratio refers to aluminum alcoholate to hydrolysis solution in a clarified range. It is respectfully submitted that as amended Claim 9 overcomes the rejection under Section 112.

Turning to the art rejections, Claims 1-9 stand rejected as unpatentable over U.S. Patent 5,455,019 to Inui (Inui). The rejection is respectfully traversed. To begin with, Inui is directed to a method for producing finely dispersed aluminum hydroxide wherein an aluminum alkoxide derivative and water are continuously reacted under high shear. Inui does not teach reacting the aluminum alkoxides and water as opposed to reacting aluminum alkoxides and the chemical modifier to produce a derivative reaction product of aluminum alkoxide and wherein an aluminum-alcohol bond is exchanged for an aluminum-chemical modifier bond to produce the aluminum alkoxide derivative.

It is true that Inui notes that amino acids can be used as a chemical modifier. However, as can been from column 4, lines 5-45, the chemical modifier

includes a virtually innumerable number of compounds, with no indication that any one or group of chemical modifiers would be any better than any other one or group of chemical modifiers. Indeed, it can be seen with reference to the examples in Inui that in no case is an amine employed as the modifier. Thus as a starting point the skilled artisan having the broad disclosure of possible chemical modifiers would have no reason to select the organic compound specificied in Applicant's Claim 1 as opposed to any other chemical modifier listed in Inui.

Further, as taught by Inui in column 5, lines 49-52, the aluminum hydroxide particles obtained have an average particle size of about 15 μm or less with respect to 98% of all particles. Again this is consistent with the examples of Inui which teach that the amorphous aluminum hydroxide obtained is from 0.57 μm to 7.0 μm (examples 1-10, 13, and 15-24) and pseudoboehmite with a particle size between 2.8 to 5.5 μm (examples 11, 12 and 14). There is no indication of pore volume, surface area or average pore radius for any of the products. Moreover, Inui does not teach that the products comprise ultra small particles/crystallites.

The process of Inui produces aluminum hydroxides which when calcined at a temperature of about 700℃ to about 1,100℃ produce transition aluminates such as γ-, δ-, and θ- aluminas. Additionally in column 5, lines 42-45 Inui teaches that when aluminum hydroxide is calcined at a temperature of about 1,100℃ to about 1,400℃, α-alumina is obtained. In any event, the unmistakable teaching of Inui is that the products obtained are the amorphous aluminum

hydroxides, boehmite and pseudoboehmite. It is respectfully submitted that the Examiner has incorrectly equated the formula n-($Al(OH)_3$) with the formula $Al_2O_3 \cdot 3H_2O$. This incorrectly equates the boehmites of Inui with aluminum trihydroxides. As is well known to those skilled in the art, boehmite has the formula n-AlO(OH) - this is not a trihydrate.

The products of Inui are clearly different from those produced according to the present invention. As clearly stated in Claim 1 the process of the present invention provides a method for the manufacture of an aluminum trihydrate – not boehmite. It is well known that when an aluminum hydroxide such as boehmite is calcined and as taught by Inui, transition aluminas such as γ-, δ-, and θ-aluminas are obtained. It is well known that only boehmite alumina transforms into γ-, δ-, and θ-aluminas. In contrast; when calcined, alumina trihydroxides transform into η-, χ-, and ρ-aluminas. The Examiner's attention is respectfully directed to Fig. 1 of the attached article entitled Standard Transition Aluminas, Electron Microscopy Studies. As shown in Fig. 1, at temperatures as low as 200℃ aluminum trihydrates, e.g., bayerite transforms into η- and ρ- forms of alumina. In contrast, boehmite undergoes no phase transition until far in excess of 400℃. Thus, Inui clearly teaches that the product produced is boehmite alumina – not aluminum trihydrate.

Applicant's claims require that the hydrolysis be conducted at a pH greater than 8 in order to avoid the precipitation of the alumina as boehmite or pseudoboehmite, the products of an Inui reaction. While the Examiner has recognized that Inui is silent as to the pH, the Examiner has concluded that since

an alumina hydroxide is prepared, the pH would have to be basic. However, Applicant would respectfully point out that if an amino acid such as asparaginic was employed, the pH would be acidic. Since asparaginic acid could be one of the Inui modifiers, it cannot be concluded that Inui is teaching a pH of greater than 8. If Inui's modifiers such as asparaginic acids are employed it is necessary to add basic substances to adjust the pH as taught in Applicant's specification on page 5, lines 21-24. Since it is the goal of Applicant's process to obtain aluminum trihydrates, it is important that the pH of the hydrolysis solution be greater than 8 and preferably 9-12. In contrast, since Inui is only concerned with the manufacture of boehmite type aluminas, pH vis-à-vis maintaining an alkaline solution is not a consideration.

It is respectfully submitted that Claims 1-9 are patentable over Inui.

Claims 10-16 and 18-19 stand rejected as being unpatentable over Inui as applied to Claim 1 in further view of U.S. Patent 6,030,599 to Noweck (Noweck). This rejection is also traversed. To begin with, Claims 10-16 and 18-19 are dependent claims which further limit Claim 1. As demonstrated above, Claim 1 is clearly patentable over Inui and the infirmities of Inui vis-à-vis rendering Claim 1 unpatentable are not cured by resort to Noweck. Thus, for this reason alone Claims 10-16 and 18-19 are patentable over the combination of Inui and Noweck.

Furthermore, Noweck teaches away from Applicant's invention. Noweck discloses a method for producing boehmite or pseudoboehmite in nano-crystalline form by reacting aluminum alkoxides with an acid followed by hydrolysis with water, essentially the same procedure employed by Inui. Thus,

unlike Applicant's claimed process, Noweck conducts hydrolysis at acidic pH values and at higher temperature ranges, the preferred range being 60℃ to 110℃ (see Noweck column 2, lines 31-32, lines 52-53). The pH and temperature ranges employed by Noweck are different from Applicant's and clearly would result in a different product. Again, Applicant's process is directed to the formation of aluminum trihydroxides in contrast to Noweck where boehmites are formed. Thus, since Noweck teaches a different end product, a different pH and a substantially different temperature range, Noweck teaches away from Applicant's claimed process. It is respectfully submitted that Claims 10-16 and 18-19 are patentable over Inui in combination with Noweck.

Claim 1 stands provisionally rejected on the basis of non-statutory obviousness-type double patenting in view of Claim 1 of copending application number 10/564,244. This provisional rejection is also traversed. The '244 application relates to a method for producing boehmite alumina via hydrolysis and aging at temperatures between 120℃ to 250℃ for at least one hour. Thus, in the '244 application the hydrolysis carried out at temperatures range 50° to 95° higher than Applicant's claimed range of 0℃ to 60℃. Furthermore, like Inui and Noweck, the '244 application is directed at producing boehmite aluminas, not aluminum trihydrates. Accordingly, it is respectfully submitted that Claim 1 is not obvious in view of Claim 1 of the '244 application and that there is no need for a Terminal Disclaimer if and when Claim 1 of the '244 application is found to be patentable.

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims are in condition for allowance, which is hereby earnestly solicited and respectfully requested.

Respectfully submitted,

/C. James Bushman/

C. James Bushman
Reg. No. 24,810

Date: June 23, 2009

BROWNING BUSHMAN P.C.
5851 San Felipe, Suite 975
Houston, Texas 77057
Tel.: (713) 266-5593
Fax: (713) 266-5169

X:\CJB_Clients\muller\53\53Response.doc